UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,154	03/30/2004	Lutz Raddatz	Raddatz 1	5417

46363 7590 10/03/2007

PATTERSON & SHERIDAN, LLP/
LUCENT TECHNOLOGIES, INC
595 SHREWSBURY AVENUE
SHREWSBURY, NJ 07702

EXAMINER	
LE, THI Q	

ART UNIT	PAPER NUMBER
2613	

MAIL DATE	DELIVERY MODE
10/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/813,154	RADDATZ, LUTZ	
	Examiner	Art Unit	
	Thi Q. Le	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on 23 August 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-11 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-11 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 23 August 2007 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Action is in response to Applicant's amendment filed on 8/23/2007. **Claims 1-11** are still pending in the present application. **This Action is made FINAL**

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1-9** rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishimoto et al. (US PGPub 2002/0089724 A1)**.

Consider **claim 1**, Nishimoto et al. clearly show and disclose, a method for measuring residual chromatic dispersion in an optical transmission system, the method comprising the steps of: introducing a predetermined amount of chromatic dispersion at the receive end of the system (read as, the variable dispersion compensator 10 performing wavelength dispersion compensation; figure 1, paragraph 0052); measuring a bit error rate for the system corresponding

to the predetermined amount of chromatic dispersion (read as, the bit error information mentoring circuit 12 measures the bit error rate of the received data; paragraph 0054); and iterating the introducing and measuring steps over a plurality of introduced chromatic dispersion values until the bit error rate is a minimum over all measured bit error rates (the controlling circuit 13 causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value within a preset range to determine the optimize values for minimizing the bit error rate; paragraph 0065) (note, paragraph 0059 discussed the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic)); wherein the residual chromatic dispersion in the optical transmission system is represented by a complement of the introduced amount of chromatic dispersion at which the minimum bit error rate is achieved (figure 5 show the graph of wavelength dispersion compensation value versus bit error rate; paragraph 0066). Nishimoto discloses the claimed invention except for wherein the measured BER represents chromatic dispersion only.

It would have been obvious for a person of ordinary skill in the art at the time of the invention was made to modify the dispersion compensation apparatus disclosed by Nishimoto, such that, wavelength dispersion is perform separately from polarization dispersion; thus the measured BER value represents separately a value for wavelength dispersion (i.e. chromatic dispersion) and a value for polarization dispersion. Since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art, Nerwin v. Erlichman, 168 USPQ 177, 1 t.

Further, Nishimoto disclosed that conventional art use for dispersion compensation comprises of two different circuits, one for wavelength dispersion compensation (i.e. chromatic dispersion compensation) and another one for polarization dispersion compensation (paragraph 0006).

Consider **claim 2, and as applied to claim 1 above**, Nishimoto et al. further disclose, the step of iterating is responsive to the bit error rate in the measuring step and includes selecting a new predetermined amount of chromatic dispersion for the introducing step (read as, the controlling circuit 13 received the bit error rate information and causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value in a direction corresponding to minimizing the bit error rate) (figure 1 and 5 paragraph 0068).

Consider **claim 3, and as applied to claim 2 above**, Nishimoto et al. further disclose, the step of selecting further includes controlling selection of the predetermined amount of chromatic dispersion in a manner to produce a minimum bit error rate (read as, the controlling circuit 13 received the bit error rate information and causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value in a direction corresponding to minimizing the bit error rate) (figure 1 and 5 paragraph 0068).

Consider **claim 4, and as applied to claim 1 above**, Nishimoto et al. further disclose, the step of compensating at least some portion of the residual chromatic dispersion in the optical transmission system by selecting a compensating amount from a chromatic dispersion range including 0 ps/nm through and including the introduced amount of chromatic dispersion at which the minimum bit error rate was achieved (read as, the controlling circuit 13 causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value within a

preset range (wherein, the range can be set to any value) to determine the optimize values for minimizing the bit error rate; paragraph 0065) (note, paragraph 0059 discussed the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic)) (figure 1 and 5, paragraph 0065-0068).

Consider **claim 5, and as applied to claim 4 above**, Nishimoto et al. further disclose, the step of iterating is responsive to the bit error rate in the measuring step and includes selecting a new predetermined amount of chromatic dispersion for the introducing step (read as, the controlling circuit 13 received the bit error rate information and causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value in a direction corresponding to minimizing the bit error rate) (figure 1 and 5 paragraph 0068).

Consider **claim 6, and as applied to claim 5 above**, Nishimoto et al. further disclose, the step of selecting further includes controlling selection of the predetermined amount of chromatic dispersion in a manner to produce a minimum bit error rate (read as, the controlling circuit 13 received the bit error rate information and causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value in a direction corresponding to minimizing the bit error rate) (figure 1 and 5 paragraph 0068).

Consider **claim 7**, Nishimoto et al. clearly show and disclose, an apparatus for measuring residual chromatic dispersion in an optical transmission system, the apparatus comprising: a dispersion compensator for introducing a predetermined amount of chromatic dispersion at the receive end of the system (read as, the variable dispersion compensator 10 performing wavelength dispersion compensation; figure 1, paragraph 0052); a bit error rate, test element for

measuring a bit error rate for the system corresponding to the predetermined amount of chromatic dispersion (read as, the bit error information mentoring circuit 12 measures the bit error rate of the received data; figure1, paragraph 0054); and a control element coupled to said compensator and said test element for adjusting said compensator to introduce a new predetermined amount of chromatic dispersion over a plurality of chromatic dispersion values (read as, a controlling circuit 13 controlling the wavelength dispersion compensation value based on the bit error rate information in-order to reduce the bit error rate; figure 1; paragraphs 0056 and 0068) (note, paragraph 0059 discussed the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic)); wherein at least a portion of the residual chromatic dispersion in the optical transmission system is represented by a complement of the predetermined amount of chromatic dispersion at which the reduced bit error rate was achieved (figure 5 show the graph of wavelength dispersion compensation value versus bit error rate; paragraph 0066).

Consider **claim 8, and as applied to claim 7 above**, Nishimoto et al. further disclose, the control element adjusts the compensator to a new predetermined amount of chromatic dispersion in order to ascertain the minimum the bit error rate for the system over a plurality of introduced chromatic dispersion values, and the residual chromatic dispersion in the optical transmission system is represented by a complement of the predetermined amount of chromatic dispersion at which a minimum bit error rate is achieved (read as, the controlling circuit 13 received the bit error rate information and causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value in a direction corresponding to minimizing the bit

error rate) (figure 1 and 5 paragraphs 0065-0068) (note, paragraph 0059 discussed the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic)).

Consider **claim 9, and as applied to claim 8 above**, Nishimoto et al. further disclose, the control element adjusts the dispersion compensator to a compensating amount of chromatic dispersion selected from a chromatic dispersion range including 0 ps/nm through and including the introduced amount of chromatic dispersion at which the minimum bit error rate was achieved (read as, the controlling circuit 13 causes the variable dispersion compensator 10 to change the wavelength dispersion compensation value within a preset range (wherein, the range can be set to any value) to determine the optimize values for minimizing the bit error rate; paragraph 0065) (figure 1 and 5, paragraph 0065-0068) (note, paragraph 0059 discussed the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic)).

4. **Claims 10-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishimoto et al. (US PGPub 2002/0089724 A1)** in view of **Tanaka et al. (US PGPub 20020131711)**.

Consider **claim 10**, Nishimoto et al. disclose, apparatus for measuring residual chromatic dispersion in an optical transmission system, the apparatus comprising: a dispersion compensator for introducing a predetermined amount of chromatic dispersion over a plurality of chromatic dispersion values to an optical signal (read as, variable dispersion compensator 10, wherein

wavelength dispersion (i.e. chromatic dispersion) (note, paragraph 0059 discussed the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic); and paragraph 0065 disclosed the process of sweeping the wavelength dispersion value over a preset range) and polarization dispersion are compensated for; figure 1, paragraph 0052); an optical receiver for receiving the optical signal comprising the predetermined amount of chromatic dispersion (read as, optical receiving circuit 11 receives the optical signal output from the variable dispersion compensator 10; figure 1, paragraph 0053); a bit error rate test element for receiving at least a portion of a signal output from the optical receiver and measuring a bit error rate for the system corresponding to the predetermined amount of chromatic dispersion (read as, bit error information monitoring circuit 12 measures a bit error rate concerning the receive-data signal from the optical receiving circuit 11; figure 1 paragraph 0054); and a control element coupled to the compensator and the test element for iteratively adjusting the compensator to a new predetermined amount of chromatic dispersion until the bit error rate test element measures a minimum bit error rate (read as, controlling circuit 13 automatically control the compensation amount at the variable dispersion compensator 10 based on the bit error information; figure 1 paragraph 0056); wherein the residual chromatic dispersion in the optical transmission system is represented by a complement of the predetermined amount of chromatic dispersion at which the minimum bit error rate is achieved (referring to figure 5, the point at which bit error rate is at the minimum represents the wavelength dispersion value of the variable dispersion compensator used to achieves optimum dispersion compensation; figure 5,

paragraph 0066). Nishimoto fails to disclose, the apparatus for measuring residual chromatic dispersion is place at an intermediate location in an optical transmission system.

In related art, Tanaka discloses an optical transmission system with dispersion compensation optical line. Wherein, dispersion compensators 24 are place at intermediate locations on transmission line 12, for compensating accumulated chromatic dispersion (read as, the apparatus for measuring residual chromatic dispersion is place at an intermediate location in an optical transmission system.) (figure 1, paragraphs 0015-0016, 0027, 0029).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Tanaka with Nishimoto. Because placing dispersion compensator at intermediate location along optical transmission line allow for transmission of high bit rate optical signal over longer transmission distance.

Consider **claim 11**, Nishimoto et al. disclose, a method for measuring residual chromatic dispersion in an optical transmission system, the method comprising: introducing a predetermined amount of chromatic dispersion over a plurality of chromatic dispersion values to an optical signal using a dispersion compensator (read as, variable dispersion compensator 10, compensate for wavelength dispersion (i.e. chromatic dispersion) and polarization dispersion; figure 1, paragraph 0052) (note, paragraph 0059 discussed the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic); and paragraph 0065 disclosed the process of sweeping the wavelength dispersion value over a preset range); directing the optical signal comprising the predetermined amount of chromatic dispersion to an optical receiver (read as, optical receiving circuit 11 receives the optical signal output from the variable

dispersion compensator 10; figure 1, paragraph 0053); directing at least a portion of a signal output from the optical receiver to a bit error rate test element (read as, output from optical receiving circuit 11 is sent to bit error information monitoring circuit 12; figure 1 paragraph 0054); measuring a bit error rate corresponding to the predetermined amount of chromatic dispersion using the bit error rate test element (read as, bit error information monitoring circuit 12 measures a bit error rate concerning the receive-data signal from the optical receiving circuit 11; figure 1 paragraph 0054); and iteratively adjusting the compensator to introduce a new predetermined amount of chromatic dispersion and measuring the bit error rate until a minimum bit error rate is achieved (read as, controlling circuit 13 automatically control the compensation amount at the variable dispersion compensator 10 based on the bit error information; figure 1 paragraph 0056); wherein the residual chromatic dispersion in the optical transmission system is represented by a complement of the predetermined amount of chromatic dispersion at which the minimum bit error rate is achieved (referring to figure 5, the point at which bit error rate is at the minimum represents the wavelength dispersion value of the variable dispersion compensator used to achieves optimum dispersion compensation; figure 5, paragraph 0066). Nishimoto fails to disclose, the apparatus for measuring residual chromatic dispersion is place at an intermediate location in an optical transmission system.

In related art, Tanaka discloses an optical transmission system with dispersion compensation optical line. Wherein, dispersion compensators 24 are place at intermediate locations on transmission line 12, for compensating accumulated chromatic dispersion (read as, the apparatus for measuring residual chromatic dispersion is place at an intermediate location in an optical transmission system.) (figure 1, paragraphs 0015-0016, 0027, 0029).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Tanaka with Nishimoto. Because placing dispersion compensator at intermediate location along optical transmission line allow for transmission of high bit rate optical signal over longer transmission distance.

Response to Arguments

5. Applicant's arguments filed 8/23/2007 have been fully considered but they are not persuasive.

On pages 9-10, the applicant argues "Nishimoto teaches a compensating method (that still leaves some residual dispersion), while the claimed invention concerns a measuring method. Moreover, the claimed invention measures "residual or net dispersion."" Also, Nishimoto does not disclose the claimed element "introducing" chromatic dispersion. The examiner respectfully disagrees, since Nishimoto had clearly disclosed in paragraph 0059 the method for compensating for wavelength dispersion is by applying a reverse wavelength dispersion characteristic to the optical signal (i.e. introducing the opposite wavelength dispersion characteristic). Further Nishimoto clearly disclosed with respect to figures 1-5, the method for compensating includes, setting a plurality of wavelength dispersion value of the dispersion compensator 10 within a preset range, as known as sweeping the wavelength dispersion value for the dispersion compensator 10 within a preset range, (paragraph 0065); then for each set wavelength dispersion value, the bit error rate is measured by circuit 12 (paragraph 0065); the control unit records changes in the wavelength dispersion value and bit error rate and obtains the optimum value of the wavelength dispersion based on the information of the bit error rates (paragraph 0065).

Thus, the process for compensating for wavelength dispersion, involves the steps of introducing a plurality of wavelength dispersion value to the dispersion compensator 10, then measuring the effect by monitoring the bit error rate. From figure 9, it can be seen that the dispersion compensation unit is placed at the receiver's end; hence the received wavelength dispersion is in fact the "residual or net dispersion". According to the applicant's disclosure, pages 4-5, the invention involves, using a dispersion compensator 141 to provides a predetermined amount of dispersion; then receiving the optical signal measuring the bit error rate; then providing the measure BER to the controller 143 for controlling the dispersion compensator 141 based on the measured BER, wherein the controller set the dispersion compensator such that BER is at a minimum. The complement amount of dispersion introduced by the dispersion compensator 141 at minimum BER is the total residual chromatic dispersion in the system. With context to the teaching from the applicant's disclosure, Nishimoto disclosed an equivalent apparatus and method, which involves applying different wavelength dispersion value to the dispersion compensator 10, then measure the bit error rate with respect to each wavelength dispersion value, and controlling the dispersion compensator 10 so that minimum BER is achieved based on to wavelength dispersion values.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thi Le whose telephone number is (571) 270-1104. The Examiner can normally be reached on Monday-Friday from 7:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Thi Le

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER

KENNETH VANDERPUYE
INER